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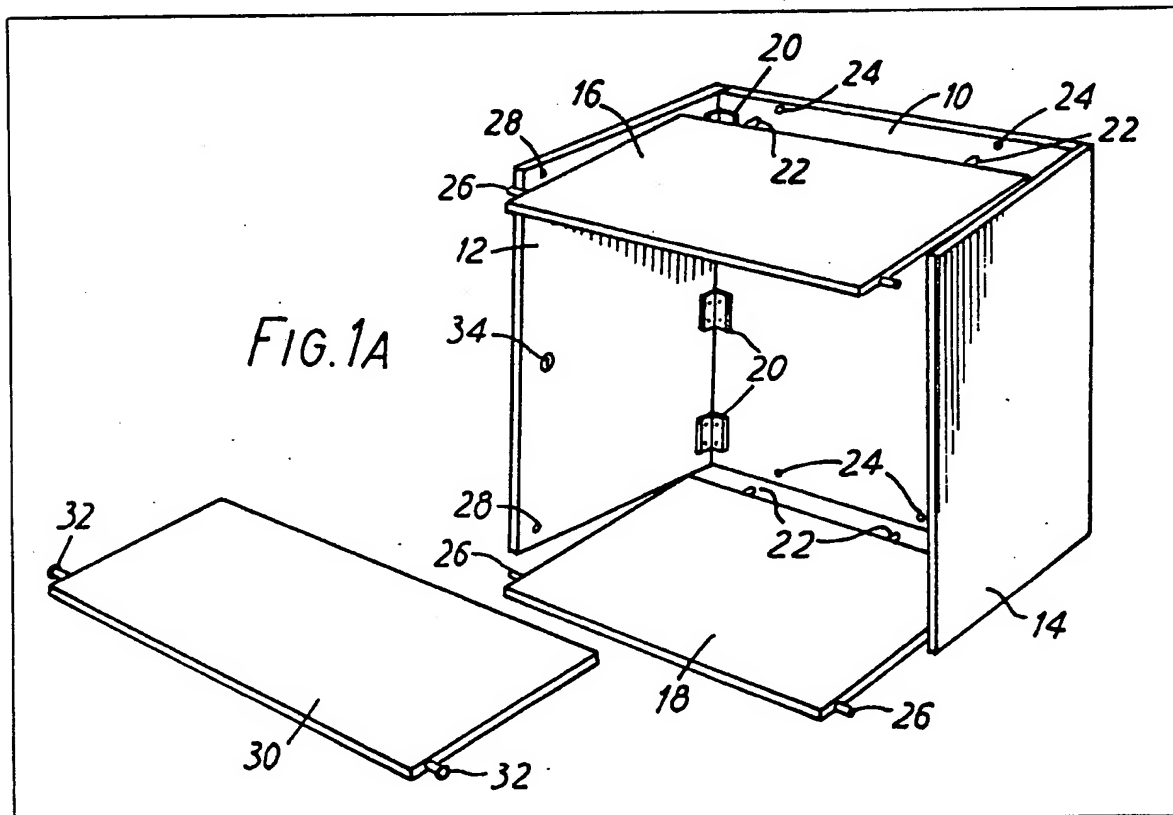
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(54) Site or self assembly furniture

(57) A knock down cabinet carcass is supplied with side panels (12, 14) already hinged to a back panel 10. To erect the carcass, the side panels are hinged open and secured together, e.g. by means of a shelf panel 30 having lateral studs 32 engaging in keyhole slots 34.



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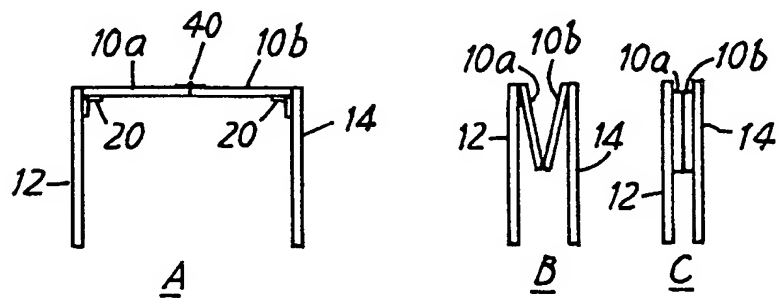
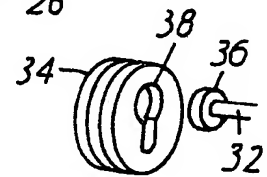
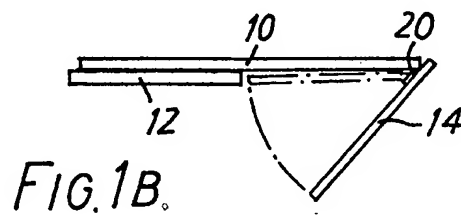
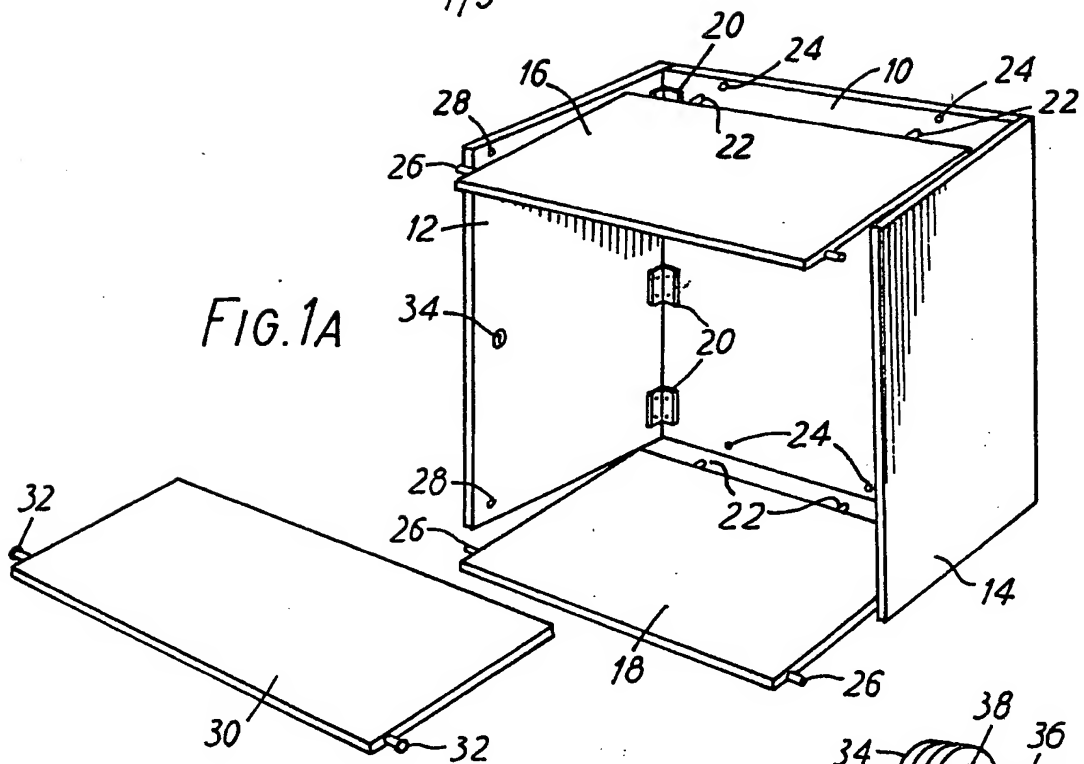
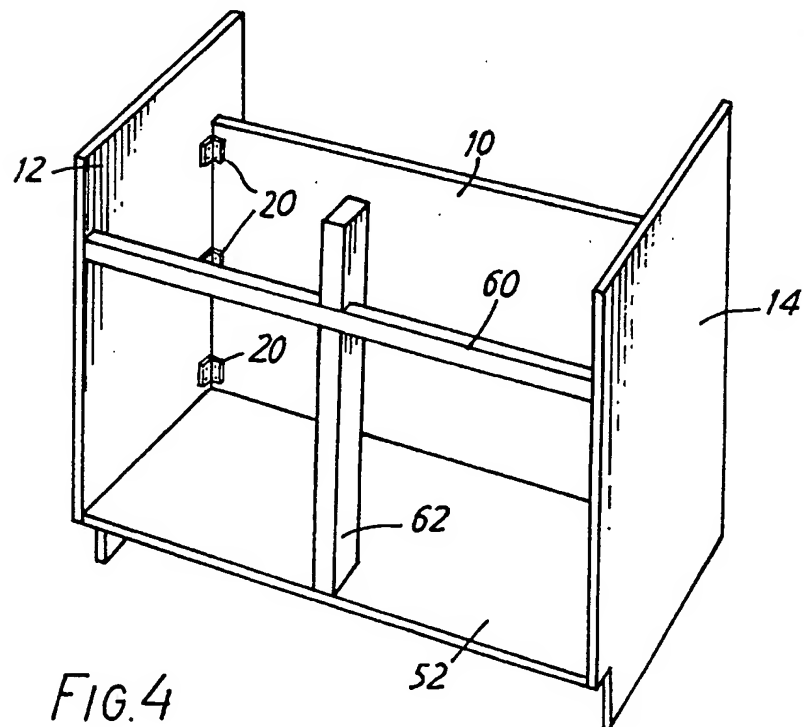
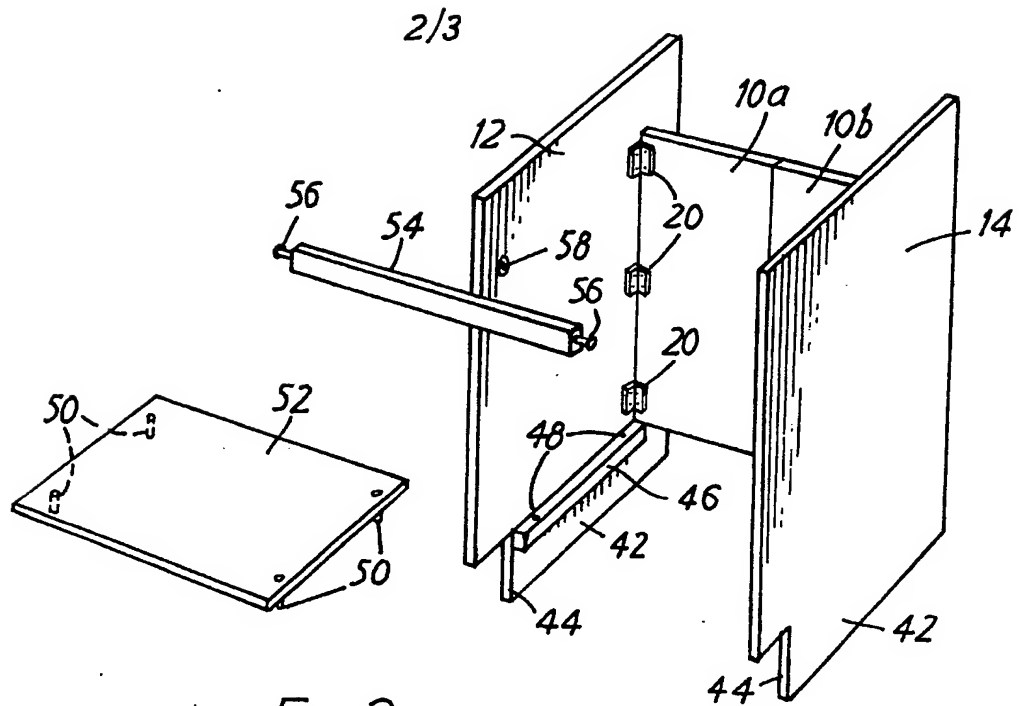


FIG. 2

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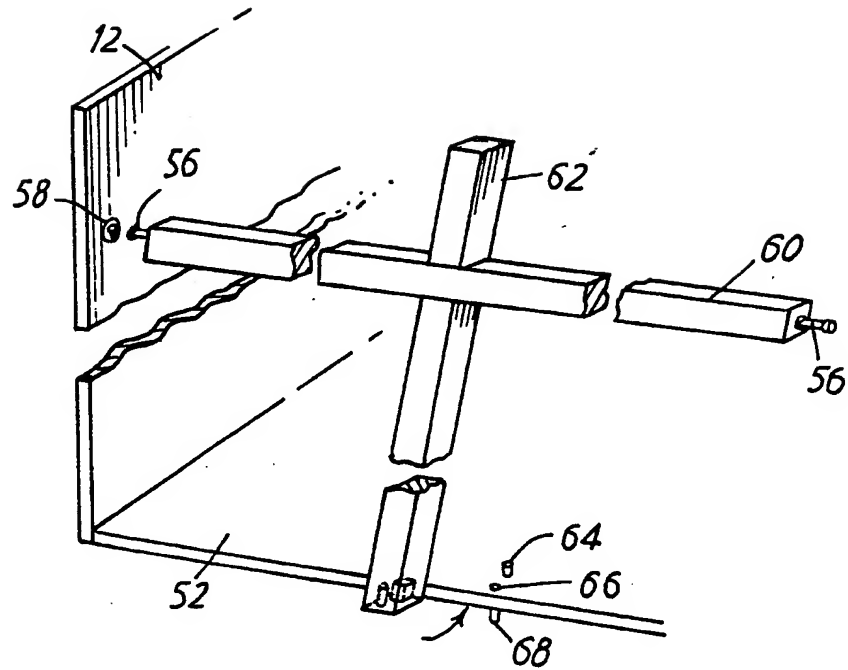


FIG. 5

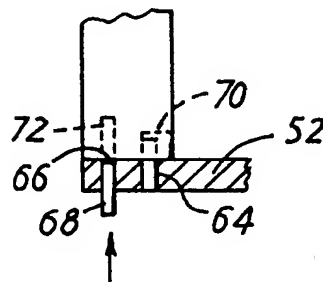


FIG. 6

SPECIFICATION

Site or self assembly furniture

- 5 This invention relates to furniture such as cabinets, and more particularly to furniture which can be supplied in a partially assembled form for subsequent assembly on site or by the end consumer. For example, such
10 furniture is useful for the provision of cabinets, etc., in kitchens and bathrooms, through the present invention is not limited to such uses.

- Many cabinets sold nowadays are of the
15 "knock down" type, sold in a flat partially assembled form. In such cabinets, the various panels are provided with "knock down" fittings, by means of which the panels can be fitted together by unskilled labour in order to
20 form the cabinet. The panels will normally be pre-drilled with holes to take the knock down fittings, or may be already fitted with them at the time of sale. In any event, relatively complex fittings are needed to ensure that the
25 panels can be assembled correctly and rigidly, and this means that the unskilled assembler of the cabinet requires to use tools to handle these fittings (at least a screwdriver) and also means that various complicated items of hard-
30 ware for the fittings, screws, etc., need to be supplied separately. Accordingly, when the purchaser opens the flat pack which contains the components for the cabinet, he finds a number of panels packed on top of each
35 other, and a bag full of various items of hardware and a set of complicated instructions. In order to assemble the cabinet, he has to read the instructions carefully, identify all the separate panels and items of hardware, and
40 follow the instructions to ensure that everything is fitted together correctly.

- Clearly this is a problem. In the case of cabinets sold directly to the do-it-yourself end consumer, it is desirable to make things as
45 easy as possible, with as little skill as possible. Furthermore, such a consumer may not possess even the most basic of tools. In the case of cabinets which are supplied for assembly in, say, a kitchen by a builder or other contractor, it is desirable to reduce the amount of
50 work and skill necessary so as to ensure that satisfactory results can be obtained at the least possible labour cost.

- At the same time, it is desirable that the
55 panels of the resulting cabinet should be held together rigidly, and with prior knockdown furniture this has not always been the case. Some prior knock down cabinets have been rigid and stable only when attached to the
60 walls of the kitchen, etc.

- The present invention provides a knock down furniture carcass comprising two side panels and an intermediate panel, the side panels being hinged to the intermediate panel
65 so that they can assume both a collapsed

- form in which they are folded towards the intermediate panel and an erected form in which they form opposing sides for the furniture carcass; and means for securing the side
70 panels in the erected condition. Thus, the furniture item can be supplied to the end user with the side panels folded down against the intermediate panel, and all the end user has to do is to fold out the side panels and secure
75 them.

Three carcasses according to the invention for kitchen cabinets will now be described by way of example, with reference to the accompanying drawings, wherein:

- 80 *Figure 1A* is an exploded view of components of the first carcass,

Figure 1B is a plan view of parts of the carcass of *Fig. 1A*, showing how they fold into a flat form,

- 85 *Figure 1C* is an exploded view of a fitting used in the carcass of *Fig. 1A*,

Figures 2A, B and C are diagrammatic plan views of parts of a second carcass, at different stages of erection,

- 90 *Figure 3* is an exploded perspective view of the second carcass,

Figure 4 is a perspective view of the third carcass,

- 95 *Figure 5* is an exploded view of part of the carcass of *Fig. 4*, and

Figure 6 is a partially sectional detail of part of the third carcass.

- Referring firstly to *Figs. 1A to C*, the carcass of the cabinet is formed by a back panel
100 10, two side panels 12, 14, a top panel 16 and a bottom panel 18. These panels may for example be made from solid timber, or from chipboard covered with a veneer or a plastics laminate, as is conventional. The side panels
105 12, 14 are permanently attached to opposed side edges of the back panel 10 by means of three spaced hinges 30 on each side. This enables the side and back panels to hinge between the erected condition seen in *Fig. 1A*
110 to a flat, collapsed condition as shown in *Fig. 1B*. The top and bottom panels 16, 18 are provided with two dowels 22 in their rear edges, which are a push fit in holes 24 in the back panel 10. The top and bottom panels
115 16, 18 also have a dowel 26 at a front portion of each of their side edges, which mates in a corresponding hole 28 in the side panel 12 or 14.

- The cabinet is also provided with a shelf 30
120 (or, if desired, two or more such shelves). Projecting laterally from front portions to the two side edges of this shelf 30 are respective metal studs 32, which mate with corresponding proprietary knock down fittings 34 provided in stopped bores in the side panels 12,
125 14. *Fig. 1C* shows these fittings in more detail. The metal stud 32 has an enlarged head 36 which fits in a keyhole slot 38 in the fitting 34. The keyhole slot 38 is arranged
130 vertically with its enlarged opening upper-

most. Thus, the shelf 30 can be fitted to the side panels 12, 14 simply by inserting the enlarged heads 36 in the corresponding keyhole slots and allowing them to drop. Because of the enlarged head 36 engaging in the slot 38, this has the effect of holding the side panels 12, 14 rigidly together with the dowels 22, 26 of the top and bottom panels securely in their corresponding holes 24, 28. Suitably, the internal recess of the keyhole slot 38 may have a cam surface so that this engagement is made even more secure.

Thus, the shelf together with the studs 32 and fittings 34 provide a means for securing the side panels rigidly in the erected condition, and as a result of this and the spaced hinges 20 provide a structure which is extremely rigid. Furthermore, it will be appreciated that this rigidity is achieved as a result of very simple erection procedure, in which no extra fittings have to be positioned by the user and no tools are required. The user simply receives a package containing the various panels in their flattened form. He places the back panel 10 with its rear face on the floor. He then hinges up the side panels 12, 14 which are already attached to the back panel. Next, he positions the dowels 22 of the top and bottom panels 16 and 18 in the holes 24, and pushes them home. It will be appreciated that the side panels 12, 14 hinge outwardly slightly beyond the normal position to allow the dowels 26 to come in register with the holes 28 at this stage. Next, the studs 32 of the shelf 30 are inserted in their respective fittings 34, and knocking the side panels 12, 14 by hand from the side will drive the dowels 26 home into the holes 28. More knocking by hand on the shelf 30 will drive the pins 32 down into the securely engaged position in the keyhole slots 38, and the basic structure of the carcass is completed.

It will be appreciated that the two pins 32 alone are not sufficient to stabilise the shelf 30, although they are sufficient to enable the shelf 30 to hold the side panels 12, 14 rigidly. The shelf 30 needs some form of support towards the rear. This can be provided in a number of ways. For example, proprietary knock down shelf fittings may be provided which simply push-fit into pre-drilled holes towards the rear of the rear of the side panels 12, 14 to hold the rear of the shelf 30. This arrangement is however not preferred because of the need for extra fittings which have to be fitted by the user. Alternatively, the rear edge of the shelf 30 may have dowels similar to the dowels 22, fitting in further pre-drilled holes in the back panel 10. The most preferable and simplest possibility, however, is for the central hinges 20 at each side of the back panel 10 to be so positioned that the rear corners of the shelf 30 can simply rest on top of them. It will be appreciated that the two later methods of supporting

the rear of the shelf use no extra hardware not already pre-fitted to the panels, and use no tools.

Once the basic carcass has been erected in this manner, other items such as front doors can be added to it as required. These will of course be supplied flat in the same package as the carcass, and may be fitted to the carcass in the same manner as with conventional knock down furniture. It is of course preferred that the fittings used, e.g. hinges for the front doors, should as far as possible be pre-fitted to the various panels and that it should be possible to do the assembly work without the use of tools.

Thus, there is provided a knock-down cabinet which is extremely simple to erect, both because there are relatively few separate pieces in the package so that the erection procedure is not confusing, and because the time taken to erect the carcass is only a few minutes. Moreover, despite the fact that there are no complicated fittings, the hinges 20 spaced along the joint between the side and back panels makes the construction extremely rigid.

Instead of the dowels 22, 26 and mating holes 24, 28, it is possible for the top and bottom panels 16 and 18 to have tongued edges which mate with grooves in the panels 10, 12 and 14. In practice, however, we have found that this is not as easy to assemble, particularly if the panels have warped slightly. Furthermore, unless expensively formed stopped tongues and grooves are used, the edges of the tongues and grooves are unsightly at the front of the cabinet.

The studs 32 can if desired be screws with suitably shaped heads, which are partially screwed into the edges of the shelf at the factory.

It will be appreciated that it is only convenient to fold the rear and side panels in the manner shown in Fig. 1B if the depth of the cabinet (i.e. the width of the side panels) is less than or equal to roughly half the total width of the cabinet (i.e. the width of the back panel). This would be the case, for example, in most double cupboard units, but in the case of a single base unit for use in a kitchen it often happens that the width of the cabinet is not much greater (or even less than) the depth from front to back. In such a case, the arrangement of Fig. 1B cannot neatly be achieved. Fig. 2 shows a construction by which this can be overcome. As previously, the side panels 12, 14 are hinged to the back panel by hinges 20. However, the back panel is split vertically into two panels 10a, 10b, which are hinged together along their common edges by spaced hinges 40. These hinges are provided on the rear of the panels 10a, 10b so that they hinge in the opposite sense to the hinges 20. This is best seen in Fig. 2B, which shows the panels in a partially

collapsed state. Fig. 2C shows the panels in the flat, fully collapsed state in which they will be packaged by the manufacturer with other panels.

- 5 Fig. 3 shows a practical embodiment of a cabinet using the principle of Fig. 2. This is to provide a single base unit for a kitchen. The side panels 12, 14 are provided with lower extending portions 42 to rest on the floor, the front corners of which are cut out at 44 as is conventional. Additionally, the side panels 12, 14 are provided at the time of manufacture with horizontal battens 46 at the tops of the base portions 42. These are pre-fitted by the manufacturer by any suitable means, e.g. screws. As will be seen from the Figure, the back panels 10a, 10b have their lower edges at the same level as the top edges of the battens 46, so that the panels can fold down to the form shown in Fig. 2C without the battens 46 fouling the panels 10a, 10b. In their upper edges, the battens 46 are provided with two holes 48. These receive downwardly projecting dowels 50 provided in a floor 52 for the cupboard. The dowels 50 are push fit in the holes 48, and when erecting the carcass, the user first hinges the panels 12, 14, 10a, 10b into the form shown in Fig. 3, and then positions the floor 52 on top of the battens 46 and knocks the dowels 50 home into their holes 48. Preferably, the dowels 50 are supplied ready fitted to the underside of the floor 52, though it would be possible to provide them separately, and place them in holes in the floor 52 before assembling the floor to the side and back panels. This might make packaging the floor 52 marginally easier, but it is not preferred because it increases the number of components which the user has to sort out and fit in the correct place.

- It will be appreciated that the floor 52 with the dowels 50 fitting in the holes in the battens 46 thus provides a means for securely holding the side panels 12, 14 together, at least at their lower ends. In order to provide a similar rigid securing at the upper portion of the side panels 12, 14 a front cross member 54 is provided. This is pre-fitted with studs 56 exactly the same as the studs 32 in Fig. 1A. The studs 56 project longitudinally from the ends of the cross member 54, and fit in corresponding keyhole fittings 58 in the side panels 12, 14 in exactly the same way as the keyhole fittings 34 in Fig. 1A. It will be appreciated that the fitting of the cross member 54 should take place at the same time as the fitting of the floor 52. It will also be appreciated that the fact that the floor 52 extends right up to the back panels 10a, 10b ensure that these panels are held rigid in the fully opened form shown in Fig. 3, with no tendency for them to come forward. Thus, the hinges 20, 40, the floor 52 and the cross member 54 between them make the resulting

carcass extremely rigid. As previously, the user has had to fit no extra fittings and use no tools in order to assemble the carcass, and the operation of assembly is again extremely simple and quick.

- Once this rigid carcass has been assembled, it is an easy matter to fit a cupboard door beneath the cross member 54, drawer runners on the interior of side panels 12, 14 above the cross member 54, an interior shelf in the cupboard if required, etc. Conventional fittings can be used for this purpose. It is of course preferred that the fittings should be of a type which can be supplied already attached to the various panels, shelves, doors, etc., and can be push fitted into holes without the use of tools. This ensures that the entire cabinet can be assembled without the use of tools and with the greatest simplicity. Another component which can be fitted at this stage is a conventional kickboard across the front of the cut-away corners 44, beneath the floor 52 of the cupboard. This can simply clip onto fittings on the lower side portions 42. The particular design of base unit shown in Fig. 3 does not have a top panel of its own, since this would normally be provided by a larger working top extending over several such units.

- With this cabinet, it is desirable to provide some means to prevent the cross member 54 twisting about the axis of the studs 56. One way of doing this is to provide an extra longitudinally extending pin or a dowel at one or both ends of the cross member 54, mating with a corresponding hole in the side panel 12 or 14. Another possibility is to provide a drawer runner, the front portion of which is provided with a downwardly extending flange which fits flush against the rear surface of the cross member 54, preventing it from twisting.

- The spaced hinges 20, 40 can if desired be replaced by long hinges running the entire length of the join between the panels. Such an arrangement increases rigidity but if a shelf is fitted may not be convenient.

- Figs. 4 and 5 show a double base kitchen unit which is constructed on the same principle as the unit shown in Fig. 3, except that as the back panel 10 is of twice the width, it does not need to be divided into two separate hinged panels, but rather can be a single panel as in Fig. 1A. As previously, the side panels 12, 14 are held rigidly in position by the hinges 20, downwardly projecting dowels in the floor 52, and a cross member 60 which is fitted in exactly the same manner as the cross members 54 in Fig. 3. A vertical post 62 is provided, and this mates with the cross member 60 by means of grooves in the rear surface of the cross member 60 and the front surface of the post 62 forming a conventional half-cross joint. The post 62 and cross member 60 are supplied separately in the same package as that in which all the rest of the components of the kitchen unit are supplied,

and are simply press fitted together at the time of assembly. During manufacture, the floor 52 is provided at a front central portion with a fixed, upwardly projecting dowel 64 and (just in front of it) a hole 66, as seen in Figs. 5 and 6. Pre-inserted in the underside of the hole 66 is a dowel 68. In assembling the unit, once the floor 52 and cross member 60 are in position and holding the side panels 12, 14 rigidly, the user will find that the post 62 can be swung about the axis provided by the studs 56. As shown in Fig. 6, the post 62 is provided with a bottom rear slot 70, and when the post 62 is swung into the vertical position, the fixed dowel 64 engages neatly in the slot 70. The hole 66 is now in register with a hole 72 in the bottom end of the post 62, and the post is secured by tapping the dowel 68 from the underside of the floor 52 so that it engages in the hole 72 and the hole 66 to lock the post in its vertical position. It will be seen that again this fitting requires the use of no especial tools, not even a screwdriver, and the result is very neat since all the fittings are concealed (the slot 70 can of course only be seen from behind the post, i.e. from the interior of the cabinet).

The double unit is now supplied with drawer runners above the cross member 60, to take one drawer on each side of the post 62, and with double doors below the cross member 60, in the same manner as previously, and with the other various conventional fittings.

It will be appreciated that the use of the vertical post 62 secured at the bottom as described above keeps the cross member 60 from twisting. The anti-twisting measures described above for the cross member 54 in Fig. 3 are therefore not necessary.

Although the above examples are of kitchen cabinets, the same principles can be used for bathroom and other cabinets, and for other furniture including shelf units, chests of drawers and so forth.

CLAIMS:

1. A knock down furniture carcass comprising two side panels and an intermediate panel, the side panels being hinged to the intermediate panel so that they can assume both a collapsed form in which they are folded towards the intermediate panel and an erected form in which they form opposing sides for the furniture carcass; and means for securing the side panels in the erected condition.

2. A carcass according to claim 1 wherein the securing means comprises a panel with means for fixing said panel rigidly in a horizontal position between the side panels when erected.

3. A carcass according to claim 2 wherein the means for fixing the horizontal panel comprises laterally projecting studs having en-

larged heads engageable in keyhole slots.

4. A carcass according to claim 2 wherein the means for fixing the horizontal panel comprises vertically projecting dowels engageable in corresponding bores.

5. A carcass according to claim 2, 3 or 4 wherein the horizontal panel is a shelf panel or a floor panel.

6. A carcass according to claim 1 wherein the securing means comprises a beam with means for fixing the beam rigidly in a horizontal position between the side panels when erected, opposite the intermediate panel.

7. A carcass according to claim 6 wherein there is a second beam, attached or arranged for attachment at right angles to the first and locatable in a vertical position intermediate the side panels when erected.

8. A carcass according to claim 7 wherein the first-mentioned beam is arranged for attachment to the side panels pivotable about a longitudinal axis, and the second beam is arranged to hold the first beam rigid against such pivoting.

9. A carcass according to any one of the preceding claims, wherein the intermediate panel is divided into two sub-panels, one hinged to each side panel, and the sub-panels are hinged to each other at their common edges.

10. A carcass according to claim 9 wherein the sub-panels are hinged to each other in the opposite sense to the hinges with the side panels.

11. A carcass according to claim 10, having a panel arranged for fixing horizontally between the side panels when erected, and to hold the sub-panels in an opened condition.

12. A knock down furniture carcass, substantially as any described herein with reference to the accompanying drawings.

13. A piece of furniture assembled from a carcass according to any one of the preceding claims.

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